
Methods

Use of the SF-12 Instrument for Measuring the Health of Homeless Persons

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Objective. To evaluate the construct validity of the Short Form 12-item Survey (SF-12) among users of a homeless day shelter. Adding brief health assessments has potential to provide information regarding the effect that programs have upon the health status and functioning of homeless persons.

Study Setting. A convenience sample of 145 homeless persons at a day shelter in an urban setting.

Study Design. Participants were verbally administered the SF-12 that provides information on mental and physical health status and the Dartmouth Improve Your Medical Care Survey™ (IYMC) that provides information on functional health, clinical symptoms, medical conditions, and health risk. The IYMC survey system has been widely used in clinical settings to assess health status and the outcomes of care.

Data Collection/Extraction Methods. Construct validity was assessed by the following approaches: (a) the method of extreme groups was used where multivariate analysis of variance determined if SF-12 summary scores varied for individuals who differed in self-reported clinical symptoms and medical conditions, and (b) convergent validity was assessed by correlating SF-12 summary scores with the subscales.

Principal Findings. Four to 10 point differences in physical health (PCS12) and 5–11 point differences in mental health (MCS12) were found between those who reported acute symptoms and medical conditions and those who did not. A 13-point difference in PCS12 scores and a 7–16-point difference in MCS12 scores were found for those who reported none or few to several symptoms or conditions. The summary scores and subscales yielded satisfactory convergent validity coefficients that ranged from 0.62 to 0.88 with one exception.

Conclusions. The SF-12 shows promise as a valid outcome indicator for assessing and monitoring health status among the homeless. Its strengths include brevity and availability of norms for specific medical conditions.

Key Words. SF-12, health status, indigent, health outcomes, homeless

Health status indicators derived from self-report have been shown to be useful in a variety of settings for the purpose of assessing and monitoring the functional health of an individual or population. This information can be used by medical practitioners, clinical researchers, and policymakers to identify health needs to improve decision making, resource utilization, and health outcomes.

Application of self-reported health status results is dependent on the development of valid and reliable tools that are appropriate for diverse population groups. Numerous standardized tools have emerged that measure single- and multiple-health constructs (Bergner et al. 1981; Stewart and Ware 1991; McDonnell and Newell 1996). Most notable is the 36-item Short Form (SF-36) that measures eight constructs of functioning: physical function, mental health, role emotional, role physical, social function, bodily pain, vitality, and general health (Ware, Kosinski, and Keller 1996). To reduce the respondent burden and the time needed for questionnaire administration, additional short form questionnaires have been developed that consist of a single item to 12 items, assess various aspects of functioning, and have been tested with both adults and adolescents (Ware, Kosinski, and Keller 1996; McHorney, Ware, and Raczek 1996; Radosevich 1997; Nelson et al. 1987; Nelson et al. 1994; Wasson et al. 1994; Ware et al. 1992; Ware et al. 1995; Stewart, Hays, and Ware 1988; McHorney et al. 1992; Nelson et al. 1996). These include instruments such as the 12-item Short Form Health Survey (Ware, Kosinski, and Keller 1996).

The 12-item Short Form Survey (SF-12), derived from the SF-36, has been demonstrated to be reliable and valid in clinical and population-based applications in the U.S. and other countries (Ware, Kosinski, and Keller 1996;

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Gandek et al. 1998; Lundberg et al. 1999; Sugar et al. 1998; Jenkinson et al. 1997; Lim and Fisher 1999). The physical health and mental health summary scores that reproduce the summary scores derived from the SF-36, have been demonstrated to account for most of the variance in the eight subscales of health functioning, and differentiate well between groups known to differ in the presence and seriousness of physical and mental conditions, acute symptoms, age and aging, self-reported changes in health, and recovery from depression (Ware, Kosinski, and Keller 1996; Ware, Kosinski, and Keller 1998; Ware et al. 1995; Ware, Kosinski, and Keller 1994). Because of the established reliability, validity, and brevity of this tool, it would be a desirable choice for use in settings that assess the health status and needs of impoverished populations such as the homeless. However, there is a need to empirically evaluate the appropriateness of its use with this previously untested population. At first glance, the face validity of some SF-12 items appear questionable for very poor, nonworking populations, such as item content references to "playing golf," "bowling," "pushing a vacuum cleaner," and performing "work outside the home" or "housework." This observation points to a need to explore the construct validity of the SF-12 before adopting it for use with homeless persons. For example, it is important to determine if the summary scores differentiate health between those homeless persons who vary in self-reported health status as has previously been found in studies of the general population. Thus, this study explores answers to the overall question, Can the SF-12 be successfully implemented with the homeless to provide valid health status information?

Research has also shown differences in health status based on demographic strata such as income level and gender. The homeless experience more barriers in accessing health care compared to domiciled persons and have a higher prevalence of physical illness, substance dependence, and chronic mental illness (Burt et al. 1999; Wood and Valdez 1991; Gallagher et al. 1997). In addition, some research has suggested that females score lower on measures of health status compared to males (Stewart, Hays, and Ware 1988; Lim and Fisher 1999). Thus to elucidate upon the construct validity of the SF-12 among the homeless, this study compares SF-12 scores from a sample of homeless persons to SF-12 scores of a sample from the domiciled general population. In addition, comparisons are made between the scores of homeless men and women.

This paper describes the application of the SF-12 at a day shelter and provides some evidence of construct validity for the use of this instrument in assessing and monitoring health status among homeless persons.

METHODS

Sample

A convenience sample of 145 homeless persons who seek services at a day shelter located in an urban area in the southeastern United States participated in the study. The day shelter provides supportive services to remove barriers that prevent people from being housed, such as classes that address lack of work skills, showers for those who work or are seeking work, identification cards, and transportation. In partnership with the local health department health-care services are provided for those with mental and physical health problems.

Methods

Five trained interviewers verbally administered two questionnaires: the Dartmouth Improve Your Medical Care SurveyTM (IYMC) (Wasson et al. 1997) and the SF-12 (Ware, Kosinski, and Keller 1996). Interviews occurred between 7:00 A.M. and 12:00 P.M. weekdays for four weeks. Each respondent was offered a snack for participation. An attempt was made to interview all persons seeking services during the study time period. Seventeen individuals refused to respond to the survey.

The SF-12 surveys were administered to a random sample of 2,800 residents in the same county via telephone four months prior to the survey of the homeless. The residential sample was used for comparison purposes.

Questionnaires

The SF-12 survey contains categorical questions (e.g., yes/no) that assess limitations in role functioning as a result of physical and emotional health. The survey also contains Likert response formats including those that are on a three-point scale (e.g., limited a lot, limited a little, or not limited at all) that assess limitations in physical activity and physical role functioning. In addition a five-point scale (e.g., not at all, a little bit, moderately, quite a bit, and extremely) that assesses pain, and a five-point scale that assesses overall health (excellent, very good, good, fair, and poor) are included. The SF-12 also contains a six-point scale (e.g., all of the time, most of the time, a good bit of the time, some of the time, a little of the time, and none of the time) that assesses mental health, vitality, and social functioning. The SF-12 was scored using the recommended Medical Outcomes Study (MOS) SAS software program that creates two summary scores, mental health (MCS12), and physical health (PCS12). The scores are represented as t-scores that are linear

transformations with a mean of 50 and a standard deviation of 10 in the general U.S. population (Ware, Kosinski, and Keller 1998). In addition, the eight subscales, role physical, role emotional, physical function, social function, mental health, vitality, pain, and general health were derived (Ware, Kosinski, and Keller 1994). Most are composite scores consisting of two questions with the exception of four single item indicators, social function, vitality, pain, and general health. Although the SF-12 has been shown to closely reproduce the eight-scale profile of the SF-36, the results are less precise as would be expected for single-item and two-item scales. Research is currently underway to improve the correspondence between the eight-scale health profile estimated from the SF-12 and the SF-36 health surveys (Ware, Kosinski, and Keller 1998; 1994). Until further research on the calibration of scoring is complete, the subscales have not generally been recommended except for large-scale studies ($n = 500$) (Ware, Kosinski, and Keller 1996; 1998; 1994). In spite of the limitations associated with less precision, there is value to understanding covariation between subscales and summary scores (i.e., internal consistency and convergent validity) with this previously untested population, in addition to comparisons with domiciled subgroups. Consistent with recommended scoring procedures all subscale scores were transformed to a 0–100 scale with the higher score indicating less dysfunction, impairment, or pain consistent with recommended procedures for scoring (Ware, Kosinski, and Keller 1998; 1994). The questions were framed to ask respondents to rate their health and functioning during the past week.

Since the SF-12 has been shown to replicate SF-36 scores in differentiating the health status of persons with varying symptoms and acute conditions (Ware, Kosinski, and Keller 1998, 1994), homeless respondents were asked IYMC survey questions regarding specific symptoms and known conditions (Wasson et al. 1997; 1999; Hess et al. 1999). Specifically, respondents were asked if they had been bothered by any of the following symptoms during the past four weeks: headache, stomach or abdominal pains, dizzy spells/tiredness/fatigue, chest pains, menstrual/menopausal problems, eating/weight problems, skin problems, trouble urinating, sexual problems, asthma/breathing problems, joint pains, backaches, trouble sleeping, or foot trouble. For the symptoms experienced, the response categories of “never,” “seldom,” “sometimes,” “often,” and “always” were converted to dichotomous response categories such that “never” and “seldom” were categorized as a negative response and “sometimes,” “often,” and “always” were categorized as an affirmative response. In addition, respondents were asked if a doctor had ever told them that they had specific medical conditions: high blood pressure, asthma/

bronchitis/emphysema, arthritis, heart trouble/hardening of the arteries, diabetes, or serious obesity (Wasson et al. 1997; 1999). The response categories to these latter questions were "yes" or "no." These IYMC questions were chosen because they have been widely used in clinical settings to provide patient self-reported information (Wasson et al. 1997; 1999; Hess et al. 1999). This approach has been validated by its use in studies of patient care that were designed to improve patient outcomes; information obtained from the IYMC has been successfully used to document and track changes in patient health status and outcomes over time (Wasson et al. 1999).

Analysis

Two methods were used to assess the construct validity of the SF-12 with the homeless population. First, consistent with previous studies of the SF-12 and SF-36, the method of "known" or "extreme" groups was implemented (Ware et al. 1995; Ware, Kosinski, and Keller 1994; Nunnally 1970). This method essentially uses at least two groups; one of which has the characteristic or trait in question. The group with the characteristic or trait will score significantly higher or lower (depending on how scores are derived) on the new instrument compared to the group without the characteristic or trait. This method has been used to establish the validity of the SF-12 wherein individuals who had specific conditions or illnesses demonstrated significantly lower health-status scores than those who did not (Ware, Kosinski, and Keller 1996, 1998; Ware et al. 1995). Thus, multivariate analysis of variance were performed to determine if SF-12 summary scores of homeless persons who reported they had a specific health condition, such as asthma, or who reported acute symptoms such as difficulty breathing, were lower compared to the health scores of those who reported having no specific health condition or symptom. In addition, multivariate tests were conducted to determine if SF-12 summary scores were significantly lower for those who reported more compared to those who reported fewer symptoms and conditions. It was hypothesized that those who reported the presence of health conditions and acute symptoms would demonstrate lower health-status scores compared to those who did not and as the number of symptoms and conditions increased, health-status summary scores should decrease.

Second, convergent validity is often assessed by determining how closely a scale is related to other indicators of the same construct (Streiner and Norman 1995). One would expect that similar measures would correlate more highly than dissimilar measures. In this study, convergent validity was

assessed by determining how closely the subscales were related to the summary scores that purport to measure the same construct. This was accomplished by computing correlations for each subscale and the PCS12 and MCS12. The pattern of correlations should reflect the measurement model for the SF-12 wherein the subscales that purport to measure physical health (physical function, role physical, bodily pain, and general health) should correlate more highly with PCS12 than with MCS12. The mental health subscales (vitality, social functioning, role emotional, and mental health) should correlate more highly with MCS12 than with PCS12 (Ware, Kosinski, and Keller 1996).

Additional analyses compared the SF-12 scores of the homeless sample to the SF-12 scores of the household sample. Multiple analysis of variance was used to determine if differences existed. T-tests were conducted to determine if SF-12 summary scores and the number of reported symptoms and conditions differed by gender.

Although it has been suggested that internal consistency estimates underrepresent the reliability of the SF-12 summary measures (Ware, Kosinski, and Keller 1998, 1994), it was considered worthwhile to explore this property of the survey with the homeless. Cronbach's alpha was computed on the mental and physical health summary scores (Nunnally 1970). The coefficients were computed on the general population sample as well, for comparison purposes.

RESULTS

Demographics

Respondent demographics can be seen in Table 1. Seventy-seven percent of the sample were male, 54 percent were African American, and 85 percent were younger than 45 years of age. The average age was 37.

Health Problems

As can be seen in Table 1, approximately half of the sample complained of headaches, dizziness, or fatigue, joint pain, backaches, and trouble sleeping either "sometimes," "often," or "always." When all thirteen symptoms were summed, 91 percent experienced one or more health symptoms.

Sixty-five percent of the sample reported having been previously told by a health professional that he or she had high blood pressure. Twenty-

seven percent indicated the presence of asthma/bronchitis/emphysema, while 20 percent indicated that they had arthritis. When totaled, 57 percent indicated the presence of one or more medical conditions while 43 percent indicated they had never been told that they had any of the conditions listed in Table 1.

Comparison with Countywide Sample

Table 2 shows the respondents' scores on the MCS12, PCS12, and the eight subscales. These are compared to the scores of randomly selected residential

Table 1: Demographic Characteristics and Health Problems Reported by the Homeless

Demographic Characteristics (n = 145)			
Age: 37.40 (Mean)		8.26 (Std)	
21–25		7.9%	
26–30		12.6%	
31–35		22.0%	
36–40		22.7%	
41–45		20.4%	
46–50		7.9%	
51+		6.4%	
Gender			
Male		77.1%	
Female		22.3%	
Race			
African American		53.9%	
Caucasian		44.3%	
Other		1.8%	
Health Problems Reported by the Homeless (n = 145)			
Symptoms Experienced During the Past Month		Medical Conditions Reported	
Trouble Sleeping	58%	High Blood Pressure	65%
Dizzy spells, Tiredness, or Fatigue	55%	Asthma/Bronchitis/Emphesyma	27%
Headaches	53%	Arthritis	20%
Backaches	50%	Heart Trouble	17%
Joint Pain	48%	Sugar Diabetes	9%
Eating or Weight Problems	40%	Serious Obesity	5%
Stomachaches	38%		
Chest Pains	35%		
Foot Trouble	35%		
Asthma or Breathing Problems	34%		
Skin Problems	21%		
Trouble Urinating	13%		
Sexual Problems	18%		

Table 2: Means and Standard Deviations of SF-12 Summary Scores* and Subscales** of Homeless Sample Compared to Countywide Sample

Comparison Groups							
Countywide Sample (000'S)							
Homeless Sample (n = 145)	Overall (n = 2800)	<\$15 (n = 340)	\$15–24,999 (n = 650)	\$25–34,999 (n = 404)	\$35–49,999 (n = 449)	\$50+ (n = 509)	
Mental Health Summary	41.67 ± 12.77	51.11 ± 9.96	52.71 ± 9.25	54.13 ± 7.67	54.13 ± 7.69	54.70 ± 6.83	
Physical Health Summary	44.21 ± 11.75	45.72 ± 11.42	47.86 ± 10.48	50.97 ± 8.70	51.73 ± 7.76	52.73 ± 7.22	
Physical Function	64.68 ± 38.38	68.78 ± 37.27	77.57 ± 31.81	87.09 ± 25.79	89.13 ± 22.00	92.31 ± 19.31	
Role Physical	53.57 ± 44.33	68.38 ± 44.54	75.31 ± 41.27	85.04 ± 33.36	86.97 ± 30.91	88.64 ± 29.42	
Pain	66.42 ± 32.65	76.82 ± 31.78	82.06 ± 27.65	88.19 ± 22.92	89.14 ± 20.87	91.48 ± 18.65	
General Health	47.57 ± 28.71	52.21 ± 29.85	59.92 ± 26.89	64.54 ± 23.96	68.04 ± 23.86	73.18 ± 21.86	
Vitality	52.64 ± 31.71	53.74 ± 30.62	60.25 ± 28.37	67.49 ± 24.68	67.57 ± 24.00	70.65 ± 22.57	
Social Function	57.48 ± 39.13	79.64 ± 31.29	83.97 ± 28.92	93.70 ± 17.05	93.30 ± 18.04	93.87 ± 18.14	
Role Emotional	48.20 ± 41.44	79.10 ± 37.46	84.87 ± 33.38	89.88 ± 26.56	89.86 ± 27.06	91.03 ± 26.74	
Mental Health	53.12 ± 26.43	71.18 ± 22.59	74.46 ± 21.48	77.92 ± 18.52	77.68 ± 18.87	79.39 ± 17.15	

*Summary Scores are represented as t-scores with a mean of 50 and a standard deviation of 10.
**Subscales are transformed to a 0 to 100 scale, consistent with recommended scoring procedures.^{21,23}

telephone sample. The results of a series of multiple analyses of variance demonstrated significantly lower SF-12 scores on most all comparisons with the population sample with the exception of the lowest income group. For those whose household income was reported to be less than \$15,000 per year, physical health (PCS12), physical function, general health, and vitality were not found to be significantly different from the homeless sample. Although these are two different samples taken at two points of time, the countywide data may serve as a basis for health comparisons between homeless people and household residents.

Differences by Gender

T-tests revealed that females were significantly lower on MCS12 ($x = 37.89$, $STD = 12.81$) compared with males ($x = 42.85$, $STD = 12.81$), ($t = 1.91$, $p < .01$) and females reported significantly more symptoms ($x = 6.66$, $STD = 2.97$) than did males ($x = 4.39$, $STD = 3.13$), ($t = 3.82$, $p < .05$). The two groups were not different on PCS12 or number of self-reported conditions.

Differences by Symptoms and Conditions

Table 3 shows the results of a series of multivariate analyses of variance that were conducted for each of the 32 symptoms and conditions on the MCS12 and PCS12. Twenty-six of the 32 univariate comparisons were found to be significant. In almost all cases those with a condition or who experienced a symptom exhibited a significantly lower mental or physical health score than those who did not have the condition or did not experience the symptom.

Table 4 shows the SF-12 scores by categories of total number of symptoms or conditions reported. The scores appear to differentiate well between the groups. As the number of symptoms or conditions increase, PCS12 and MCS12 decrease. Collectively, the results suggest that these indicators differentiate between diagnostic groups or levels of severity of illness. This observed variability in the PCS12 and MCS12 support validity by detecting variation in health status that is presumed to exist across the homeless sample.

Correlation between Summary Scores and Subscales

In support of convergent validity the subscales were found to correlate well with the summary scores in the manner that would be expected of internally valid indicators. For example, subscales that purport to measure aspects of physical health should correlate more highly with the physical health summary score (PCS12) than with the mental health summary score (MCS12) and vice versa

for mental health. As can be seen in Table 5, physical function and role physical correlated more highly with PCS12 than with MCS12. Also, role emotional and mental health correlated more highly with MCS12 than with PCS12. Consistent with previous findings, general health and pain correlated more strongly with PCS12, while social functioning correlated more strongly with MCS12. The vitality subscale was found to be equally correlated with both PCS12 and MCS12 (Ware, Kosinski, and Keller 1996). The PCS12 and MCS12 were not correlated with each other at all ($r = 0.008$). This supports the concept of independence of these two scales that have been previously documented (Ware, Kosinski, and Keller 1996).

Internal Consistency

The internal consistency estimates of summary scores were calculated using Cronbach's alpha. Within the homeless sample these were found to be 0.82 for physical health and 0.79 for mental health. In addition the estimates for the general population were found to be 0.78 for physical health and 0.73 for mental health. Although research suggests that internal consistency estimates may underrepresent the reliability (Ware, Kosinski, and Keller 1998), these results meet the criteria for minimum standards of 0.70 (Nunnally 1970).

DISCUSSION

The results presented here show that the SF-12 has potential to be used as an outcome indicator of health status with the homeless population. As would be expected the results clearly demonstrate that their health needs are great, as evidenced by the high percentage that reported the presence of various symptoms and conditions, in addition to the low physical and mental health scores.

Although these results are based on a single small convenience sample of users of a day shelter, the approaches used to assess the appropriateness of the tool revealed consistent results. The survey tool has potential to differentiate between levels of severity of physical and mental health conditions and appears to be internally consistent. The results support other research findings that have documented poorer health status of homeless compared to domiciled populations and differences by gender in mental health status and self-reported health problems. The potential implications for use with the homeless include the following: (a) it is fairly brief to administer; (b) it may

Table 3: Physical and Mental Health Scores for Symptoms and Conditions Reported by Respondents

Symptoms/Specific Conditions	Physical Health Summary Score				Mental Health Summary Score			
	n	Mean	SD	F	Mean	SD	F	
Symptoms								
Headaches	Yes	41.73	10.96	7.27**	38.74	12.59	8.98*	
	No	47.29	12.15		45.45	12.11		
Stomach or Abdominal Pains	Yes	41.49	11.82	4.51*	36.25	9.83	17.20**	
	No	45.92	11.53		45.14	13.24		
Dizzy Spells, Tiredness, Fatigue	Yes	40.48	11.62	17.13**	37.19	11.42	22.11**	
	No	48.56	10.40		46.89	12.34		
Eating or Weight Problems	Yes	41.69	11.11	ns	36.49	11.48	13.92**	
	No	45.69	11.98		45.01	12.50		
Chest Pains	Yes	40.21	11.17	8.04**	37.22	10.37	7.70**	
	No	46.33	11.56		44.03	13.33		
Joint Pains	Yes	38.86	11.46	31.14**	40.15	12.40	ns	
	No	49.21	9.81		43.24	13.03		
Backaches	Yes	40.27	11.89	17.42**	39.06	12.52	6.14**	
	No	48.51	10.15		44.68	12.50		
Trouble Sleeping	Yes	42.36	11.97	4.38*	36.98	10.87	28.95**	
	No	46.76	11.16		48.19	12.39		
Foot Trouble	Yes	41.22	12.65	2.08*	38.81	11.88	ns	
	No	45.81	11.15		43.25	13.07		

Sexual Problems	Yes	23	39.13	12.23	6.24**	32.90	9.14	15.52**
	No	103	45.73	11.27		43.97	12.73	
Asthma or Breathing Problems	Yes	43	39.54	11.55	10.73**	38.19	11.96	4.72*
	No	86	46.58	11.26		43.54	12.86	
Specific Conditions								
Skin Problems	Yes	27	41.17	12.63	ns	36.80	10.93	5.53*
	No	103	45.02	11.44		42.95	12.96	
High Blood Pressure	Yes	49	41.46	13.66	4.28*	39.60	12.27	ns
	No	79	46.01	10.25		43.24	12.97	
Heart Trouble	Yes	21	35.74	11.27	13.84**	34.19	10.55	3.08**
	No	104	45.80	11.29		43.43	12.85	
Arthritis	Yes	25	34.44	10.40	24.70**	42.19	12.48	ns
	No	100	46.53	10.40		41.79	13.09	
Asthma, Bronchitis/Emphysema	Yes	36	37.82	13.37	15.92**	38.09	12.87	4.41*
	No	89	46.66	10.21		43.41	12.71	

* $p < .05$, ** $p < .01$, ns = not significant

Table 4: Comparison of Means and Standard Deviations for SF-12 Summary Measures** and Subscales** by Respondents Differing in Number of Reported Symptoms and Conditions

<i>Scale</i>	<i>Number of Reported Symptoms</i>		
	0-2 (<i>n</i> = 43)	3-6 (<i>n</i> = 56)	7-13 (<i>n</i> = 45)
PSC12	51.41 (8.03)	43.17 (12.09)	38.51 (10.96)
MCS12	48.98 (12.70)	43.28 (12.26)	32.62 (8.87)
Physical Function	82.32 (31.74)	70.74 (35.47)	43.33 (35.59)
Role Physical	75.58 (35.14)	50.08 (46.64)	34.52 (40.56)
Pain	84.30 (24.41)	59.64 (32.26)	51.13 (33.22)
General Health	72.67 (18.75)	39.09 (24.89)	34.44 (26.26)
Vitality	71.62 (27.34)	52.86 (29.15)	34.22 (28.16)
Social Health	80.00 (32.75)	54.81 (36.68)	33.78 (34.59)
Role Emotional	69.05 (39.74)	52.78 (39.35)	22.62 (31.62)
Mental Health	70.00 (22.99)	50.91 (23.21)	34.54 (21.99)

<i>Scale</i>	<i>Number of Reported Conditions*</i>		
	None (<i>n</i> = 61)	1-2 (<i>n</i> = 58)	3-7 (<i>n</i> = 23)
PCS12	48.88 (9.00)	43.41 (11.00)	35.48 (14.46)
MCS12	43.53 (12.48)	42.51 (12.93)	36.24 (12.11)
Physical Function	80.93 (29.84)	56.89 (38.55)	46.56 (41.93)
Role Physical	61.86 (29.84)	53.57 (45.58)	36.95 (45.76)
Pain	79.16 (24.85)	64.47 (32.02)	41.30 (36.62)
General Health	58.19 (27.27)	47.84 (25.77)	14.31 (21.72)
Vitality	60.66 (31.82)	51.03 (30.34)	38.26 (30.09)
Social Health	62.33 (40.15)	59.31 (37.08)	41.23 (40.41)
Role Emotional	58.77 (42.39)	51.03 (30.24)	38.26 (30.09)
Mental Health	58.47 (24.76)	52.46 (27.34)	42.17 (26.45)

*Conditions = high blood pressure, heart trouble, arthritis, asthma/ bronchitis/emphysema, obesity, diabetes

**Summary Scores are represented as t-scores with a mean of 50 and a standard deviation of 10. Subscales are transformed to a 0 to 100 scale, consistent with recommended scoring procedures.^{21,23}

be implemented in a day shelter or other setting at intake as an assessment to determine health-care needs for referral (i.e., cutoff values for referral would need to be established); (c) can potentially be used to track and monitor health status dependent upon further research that establishes validity and test-retest reliability; and (d) norms for the MCS12 and PCS12 are available for comparison purposes.

Table 5: Correlation of Summary Scores with SF-12 Health Status Subscales

<i>SF-12 Subscales</i>	<i>Physical Health</i>	<i>Mental Health</i>
Physical Function	0.80	0.05
Role Physical	0.75	0.26
Pain	0.73	0.23
General Health	0.62	0.28
Role Emotional	0.21	0.73
Mental Health	0.06	0.88
Vitality	0.44	0.48
Social Function	0.21	0.73

A potential limitation of collecting this type of health information is the need to use verbal administration. Because of the brevity, however, it may easily be incorporated into existing processes in many settings that serve the homeless. Anecdotal comments made by the interviewers suggest that homeless were quite able and willing to answer the questions. Many expressed concern about their health status and access to care and spoke about their health problems following the survey administration. Interviewers were able to provide those individuals with information about how to get the care they desired.

The present study had several limitations that should lead to continued evaluation of this instrument with the homeless: (a) the reliability of the instrument was not adequately assessed; thus, further research should examine the test-retest reliability and the stability and consistency of the scores over time; (b) this study did not directly address the validity of the MCS12; validation work needs to be done in regard to mental health status; (c) construct validation was assessed using self-reported information; although research suggests homeless adults may be accurate in recalling ambulatory medical visits (Gelberg and Siecke 1997), further research may employ other more objective indicators of health status; (d) other types of validity need to be assessed with this population such as criterion validity; and (e) finally, differences between the countywide and homeless sample may be due to mode effects. Thus further research may be directed to testing for this difference.

CONCLUSIONS

Collecting information to understand the functional health of homeless persons based on self-reported information can be useful in identifying health needs of this often hidden population. Valid and reliable tools must be

developed or identified that can easily be implemented in a variety of settings that serve the homeless. In spite of questions related to face validity, the SF-12 shows promise as a tool to provide understanding about the physical and mental health status of the homeless.

There are many potential applications that could prove to be beneficial to this population. One such application is diagnostic. Because the homeless often do not have access or do not attempt to seek medical care until they are extremely ill, brief tools such as these can be implemented in virtually any setting (e.g., day shelters, soup kitchens) to be used for triaging to other service sites. This would require the development of cutoff values to determine the level of need for physical or mental health intervention.

Another potential application is program design and the monitoring of health outcomes. As programs are initiated that offer mental health or medical services to this population, brief measures such as the SF-12 can provide information on medical effectiveness. This information can also be used to improve the design of care. Because a major goal of health care is to maximize functioning, self-reported health-status information could lead to the development of comprehensive strategies that promote a level of functioning necessary for autonomous living.

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